Report to Technology Council on ASHRAE's Response to Moisture Problems In Building Located in Hot, Humid Climates

1/13/01

1. A new task group on moisture management in buildings was formed at the Summer Meeting in Cincinnati

Name: TG9.MMB – Moisture Management in Buildings

Chair: Carl Lawson

Scope: With current design and installation techniques that comply with the requirements of ASHRAE's ventilation and energy conservation standards for commercial and residential applications, buildings in humid areas that whose design points are above 55 ° F experience moisture control problems, which results in moisture damage to the facilities; occupant discomfort; occupant health problems; and excessive energy consumption. This humidity problem is even more prevalent in applications where packaged, single units and split systems are being sized and installed by non-technical personnel.

Technology Council recommended at Tech Weekend that the scope of the task group be expanded to include, but not limited to, weather data; load calculations; system selection; design and applications; equipment selection and applications; and operation and maintenance.

2. The new ASHRAE Design Guide for Humidity Control in Commercial Buildings was published 12/27/01.

Research sponsored by TC 9.12 and jointly funded by ASHRAE, DOE and the Gas Technology Institute under ASHRAE Research Project RP-1047 has resulted in the development of a design guide publication, which provides practical advice to building design teams on how to maximize the benefits of controlling indoor humidity while at the same time minimizing costs.

The book includes sections on humidity effects, system design, equipment and controls, applications and design references. Guidance is provided for schools, office buildings, retail buildings, hotels, restaurants, museums, libraries and archives, hospitals, eldercare buildings, dormitories, swimming pools, ice rinks, dry air storage and laboratories.

The cost of the Design Guide for Humidity Control in Commercial Buildings is $120 ($78, special introductory price to ASHRAE members). The book is 480 pages in length. Authors: Lewis G. Harriman, III, G. W. Brundrett, Ph.D., CEng., R. Kittler.

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3. Research

Current:

RP-1121 – "Evaluating the ability of unitary equipment to maintain adequate space humidity levels; Phase I" sponsored by TC 7.6. Status: Mike Brandemuehl has completed the project and turned in the final report to Manager of Research.

RP-1170 – Identify and characterize international weather data sets and sources. On-line database of sources. Sponsor TC 4.2.

RP-1171 – "Sources of Uncertainty in the Calculation of Design Weather Conditions in the *ASHRAE Handbook – Fundamentals*" Sponsored by TC 4.2. The study may allow for more locations.

RP-1018 – "A Thermal and Moisture Transport Property Data Base for Common Building and Insulating Materials" Sponsored by TC 4.4.

Planned:

Research project "Evaluating the ability of unitary equipment to maintain adequate space humidity levels; (Phase II: Simulations, Summary and Development of Guidelines)" sponsored by TC 7.6. Status: Project listed in 2001-2002 ASHRAE Research Plan prepared by RAC.

Research project "Effect of compressor and blower modulation on dehumidification and SEER" in development by TC 7.6.

4. Programs

Current:

Symposium AC-02-05: "Methods and Effects of Improving Efficiency of Unitary Equipment to Meet New Energy Efficiency Requirements." Sponsor TC 7.6.

Symposium AC-04-04: "Characterizing the Performance of Desiccant Systems." Sponsor TC 3.5.

Seminar 8: "Dehumidification – When to Use Mechanical and When to Use Desiccant," Sponsor TC 7.5.

Seminar 20: "Temperature and Humidity Control in Museums," Sponsors TC 9.8 and 1.7.

Seminar 24: "Practical Aspects of Measuring Humidity in Commercial Buildings." Sponsor TC 3.5.

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Seminar 27: "Design Application of Recent ASHRAE Weather Data." Sponsor TC 4.2.

Planned:

Forum. or Possible Seminar: "The History of Latent Capacity as SEER has Grown Over the Years: Facts and Myths." Sponsor TC 7.6 (Hugh Henderson).

Forum: "IAQ Needs: Humid Environments." Sponsor TC 2.3 (VanOsdell) projected for Honolulu.

Symposium: "Water Vapor Permeance and Moisture." Sponsor TC 4.4 (T. Weston) projected for Honolulu.

Seminar: "Classroom Humidity in Southern Climates." Sponsor EHC and TC 9.8.

5. Continuing Education

Current:

"A Designer's Introduction to Commercial Desiccant Systems," ALI, 1/15/02, 2-5 pm.

6. Recent ASHRAE Published Papers

ASHRAE IAQ 2001 Technical Papers:

Moisture Problems in Manufactured Housing: Probable Causes and Cures. Author: Neil Moyer, et. al. Research funded by DOE Building America Program, Subtask Moisture Research, IAQ 2001.

Controlling Moisture in Building Mechanical Systems, Lawrence J. Schoen, P.E., ASHRAE Member, IAQ 2001.

Active Humidity Control and Continuous Ventilation for Improved Air Quality in Schools, Charlene Bayer, Ph.D., ASHRAE Member, et al. Research funded by DOE Oak Ridge Lab, IAQ 2001.

Cost-effective HVAC technologies to meet ASHRAE Standard 62-1989 in hot, humid climates, Rengarajan K., Shirey, D.B., Raustad, R.A. 1996.

ASHRAE Performance of Exterior Envelopes of Whole Buildings VIII: Integration of Building Envelopes Technical Papers.

Building Failures and Successes in Hot and Humid Climates. Author Joseph Lstiburek, Ph.D., P.Eng., et al. Whole Buildings VIII 2001.

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Source: https://www.industrydocuments.ucsf.edu/docs/zyxj0001

Additional ASHRAE Publications

Mitigating the impacts of ASHRAE Standard 62-1989 on Florida schools, Davanagere B.S., et. al., 1997.

Two studies of mould and mildew in Florida buildings, Lstiburek J.W. 1992.

The causes and control of mold in hot and humid climates, Shakun W. 1992.

A computer analysis of moisture accumulation in the walls of manufactured housing, Burch D.M., Tenwolde A. 1993.

Why HVAC commissioning procedures do not work in humid climates, DuBose G.H., Odom J.D., Fairey P.W 1993

An analysis of moisture accumulation in walls subjected to hot humid climates, Burch D.M. 1993.

Fresh air treatment in hot humid climates, Berbari G.J. 1998.

Avoiding IAQ problems in new buildings with emphasis on hot, humid climates, DuBose G.H., Light J.M., 1995.

Cost-effective HVAC technologies to meet ASHRAE Standard 62-1989 in hot humid climates, Rengarajan K., Shirey D B., Raustad R.A., 1996.

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